Unit 1 / 10 Days

Communication Technology

We live, work, and play in a unique time in history, a period some people refer to as an “Information Age”. Information is so abundant that it sometimes overwhelms us. The sheer volume of news, raw data, messages, and entertainment makes it difficult to organize and manage our time. So a course in communication technology is appropriate in this age of influential media, complex systems, and global networks.

Communication is the transfer of information and human ideas. Humans routinely participate in this exchange, such as during normal conversations or through simple gestures. But these two examples don’t involve individuals using a device or system. Technical means are often used when exchanging messages since “technology” can help extend our human abilities. For instance, our voice can only be heard over a short distance (even when shouting!) while a telephone network can increase the effective range of our voice . . . . to anywhere on the planet.

There are many technical devices and systems used to transfer information. Some of them are visual, or graphic-based such as printing and photography. These techniques involve primarily the human sense of vision. Audio systems enhance our ability to hear over greater distances or allow us to record sound for enjoying at a later time. Finally, some communication technologies combine sight and sounds (audio), so are often referred to as “multimedia”. Systems such as television, motion pictures, or computer applications fall in this category.

No matter what type of system is used, communication involves a basic set of transmission or transfer techniques. Basically, messages are encoded, transmitted, received, and then decoded at the other end. As information moves from Point A to Point B, a communication exchange has occurred.

Although we have seen spectacular advances in communication technologies in recent years we must be aware that the development of these systems has been evolving throughout history. Modern breakthroughs have fueled the development of amazing technologies, resulting in entire industries that produce innovative products and services. We have also seen new markets and changing careers.

The purpose of this unit is to make students aware of the communication process, introduce the historical development of communication systems, and to help the students review the impacts of modern media in their lives. Also, students will have numerous opportunities to present ideas and explain technical information to others in the class during short presentations during this first unit.

Objectives

Upon completing this unit each student will be able to:

- ✔ Define communication and communication technology
- ✔ Describe communications systems and relate a model of the communication process various graphic and electronic media
- ✔ Identify examples of products and services that are the result of graphic and electronic communication systems
- ✔ Describe career opportunities linked to both graphic and electronic systems
- ✔ Identify important developments in the evolution of communication technologies
- ✔ Understand the impacts of communications systems on individuals, society, and the environment
- ✔ Describe the major technological actions (developing, producing, using and assessing) that people participate in as related to communication systems

Proposed Schedule For The Unit

Day	Content / Activities
1-2	Organize the course Initiate the study of communication and information technology Introduce a model of the communication process
3-6	Cover the historical evolution of communication technologies Review the development of mass communication media & systems
7-8	Explore modern communication devices and media
9-10	Identify examples of the common developing, producing, using and assessing actions associated with communication technologies Review the differences between individual and mass communication activities

Outline For Unit #1

Day	Instructional Outline (Lessons / Activities / Notes)
1-2	Complete the administrative details associated with starting the class (seating charts, class procedures, grading, etc.) and then direct the focus to human communication and information systems 1. Emphasize how "communication" describes any exchange between individuals or small audiences, while "communication technology" refers to the transfer of ideas or information (i.e., a message) using a technical means . . . . . such as a device, network, or system

Day Instructional Outline (Lessons / Activities / Notes)

2. Identify the purpose of communication among humans, namely to:
   - Inform
   - Educate
   - Persuade
   - Entertain

   Note: It's important to establish a clear distinction between the content typical of English, journalism, and related classes versus the study of technologies associated with information devices, networks, and systems
3. Highlight the limitations of human potential when it comes to the exchange of signals and information, and provide examples of technical devices or systems that help “extend” our abilities. Examples of our human senses and the means to extend those abilities include:
   - Sight (eyeglasses, night vision equipment, telescope, binoculars, telephoto lenses)
   - Sound (radios and stereo equipment, cell phones, hearing aids)
   - Touch (sensors)
   - Taste (litmus paper, research analyzers)
   - Smell (smoke detector, CO2 monitors)
   - Note: One could easily add storage and retrieval to this list, as memory is another human trait (computer hard drives)
4. Using old magazines, have the students locate and cut out pictures that illustrate the means of extending human abilities listed above (and other instances they find in the old magazines)

   Note: A poster (or colorful display board) might be created by each student or team using these pictures or images obtained from commercial sites on the WWW
5. Explain the common elements of the communication process (using the model found in the class textbook for this lesson):
   - Sender
   - Encoding
   - Transmitting media (channel)
   - Decoding
   - Receiving
   - Feedback
   - Storage (and retrieval)
   - Interference / noise
6. Use a video to highlight various print or electronic media, linking the content to the eight elements of the communication model listed above
7. Provide examples of communication / information exchanges involving these "senders" and "receivers" (both human and electronic) . . . .
   - Human to human
   - Human to machine

Day Instructional Outline (Lessons / Activities / Notes)

- Machine to human
- Machine to machine

Note: many devices and systems can be found in the school that support this lesson, such as the bar code readers used in the library or the sensors on environmental controls around the building

3-6 Review the historical evolution of communication and information technologies

1. During a formal presentation, introduce the evolution of communication starting with the earliest developments . . . .
   - Early examples include smoke signals, icons and alphabets, trail signs, etc. from the earliest civilizations
     - ✔ Loud drums were used in jungle climates
     - ✔ Signal lights were often used at sea
   - Later developments
     - ✔ Various printing techniques
     - ✔ Photography
     - ✔ Telegraph
     - ✔ Telephone
   - Developments of the past few decades
     - ✔ Television
     - ✔ Computers
     - ✔ Satellite communication
     - ✔ Magnetic tape and compact disks
     - ✔ Cable television
     - ✔ Cellular telephone networks
     - ✔ Internet / WWW
     - ✔ MP3 players
2. Have the students research a famous individual related to communication and provide a 3-5 minute oral report about the person. A sampling of inventors or business leaders in communication technology include:
   - Charles Babbage
   - John Logie Baird
   - Alexander Graham Bell
   - Tim Berners-Lee
   - Arthur C. Clarke
   - Louis Deguerre
   - Thomas Alva Edison
   - Bill Gates
   - Johan Gutenberg
   - Heinrich Rudolf Hertz

[This list is continued on the next page]

Day Instructional Outline (Lessons / Activities / Notes)

- Steven Jobs / Steven Wozniak
- Guglielmo Marconi
- Samuel F.B. Morse
- Claude Shannon
- William Shockley
- Others

3. Describe the evolution of selected systems and technologies, using multimedia and / or sample artifacts:
   - Common graphic communication systems:
     - ✔ Technical graphics / engineering drawings
     - ✔ Printed graphic images
     - ✔ Photographic techniques
   - Common electronic communication systems:
     - ✔ Acoustic / sound technologies
     - ✔ Radio and television broadcasting
     - ✔ Satellite communication
     - ✔ Data transmission systems
     - ✔ Internet / World Wide Web

   Note Staff in the media center might have "older" equipment on a shelf in storage room that can help during this lesson
4. Using a 30-in-1, 60-in-1, or similar electronic kits, have the students create a Morse Code transmitter and practice sending messages using the familiar system of dots and dashes. Note: These kits also include the plans to connect other types of circuits, such as AM radio systems and alarm devices
5. Ask the students to "assess" the challenges associated with these and other early technologies . . . all of which were considered HIGH TECH at one time or another

   Note: Naturally, there are multiple links to historical and economic trends following this review of major developments, themes that align with content standards in Social Studies

7-8 Explore modern communication and information technologies by analyzing a typical device, system, or network

1. Have each student select a modern communication device or network, then complete an illustration of the complete "systems" model of the item (identifying the sender, channel, receiver, etc.). Note: This might be done on posterboard, or using PowerPoint (or a similar program)
2. Provide the resources and time for the students to research their topic and develop the illustration
3. Schedule a show-and-tell period, so that students can describe the device or network they researched

Day Instructional Outline (Lessons / Activities / Notes)

9-10 Review communication and information technologies using the D-P-U-A model

1. Develop a log form so students can record the number and type of communication devices and systems they encounter over a typical 24 hour period. Note: This should highlight the influence of common appliances, media, etc. in daily life, and can easily lead into a discuss of the impact of communication industries on careers and the economy
2. Distribute the Communication Technology Log Form and have the students record the information tools and media they use over a 24 hour period
3. Present a brief explanation of designing / producing / using / assessing technologies with a focus on media or communication systems . . . . perhaps mention newspaper production or the promotional media on radio or TV
4. On the last day of the unit, create a listing on the board that summaries the results of Log Form activity . . . . who many different entries did the class record during the 24 hour period?
5. Conclude the unit with some form of evaluation as appropriate

Evaluation

Students may be evaluated on these actions and related criteria . . . .

- ✔ Participation in classroom and laboratory activities
- ✔ Team efforts while designing and producing media
- ✔ Actual media developed (layout, creativity, graphics, etc.)
- ✔ Quality of presentations
- ✔ Scores on teacher-created tests and quizzes

Unit #2 / 15 Days

Designing and Assessing Media / Products

The design of media and information systems is critically important to the success of the communication activity. For instance, could you understand a printed brochure if the message was printed with black ink on a dark background? Could you read a billboard along a roadside if the text were all 72-point (i.e., one inch high) type? What if TV commercials were broadcast only in foreign languages?

Design as related to communication is challenging. Media must be developed with the viewer, reader, or user in mind. That is why graphic layout rules apply to the creation of print material (magazine ads, newspapers, etc.) and multimedia (Internet web sites, computer games, etc.). Radio and TV programming is designed for various audiences, such as cartoons for youngsters and "live" broadcasts for fans of various sports.

At the same time, systems and equipment have to be carefully designed. Would you be able to design and install a cellular phone network? Probably not! But these systems must be designed and installed properly or they won't function as desired. For instance, cell towers must be strategically placed where each tower covers a geographic region (so telephone calls made by individuals in the area will be picked-up and transmitted on through the network).

This unit will cover the design process as applied to modern communication. Various types of media will be reviewed. For instance, students will be preparing storyboard forms for video media. The layout of print media will also be covered. The last few days will include a lesson on evaluating mass media. Rating systems such as the Nielsen (TV) and Arbitron (radio) services provide feedback to media specialists, who then use the audience assessments to create new programming.

Objectives

Upon completing this unit each student will be able to:

- ✔ Describe the importance of design in the development of communication media and systems
- ✔ Define audience assessment, rating systems, and other key terms
- ✔ List and explain the major steps in producing both print and electronic messages
- ✔ Design media following common rules for "good" visual layout
- ✔ Use various forms and procedures to plan out new messages
- ✔ Review various rating services that help direct the development of broadcast media

Proposed Schedule For The Unit

Day	Content / Activities
1-3	Introduce design as applied to print and electronic media
4-5	Develop print media
6-10	Complete the storyboards for a multimedia assignment
11-13	Review the means used to evaluate commercial media
14	Rate local radio stations and programs
15	Conclude the unit with some form of evaluation

Outline For Unit #2

Day — Instructional Outline (Lessons / Activities / Notes)

1-3 Introduce how design is applied to visual, audio, and audiovisual media

1. Collect either (a) a variety of newspapers and magazines or (b) record several popular TV commercials, specifically to assemble a variety of advertisements that can be used during the lesson
2. Cover the design of a few sample ads in the assembled media
   - Intended audience
   - Use of visual design principles such as balance, color, lines, etc.
   - Commercial appeal
   - Size / orientation
   - Location / placement in the publication or on the television schedule
   - Other
3. Identify the "best" and "worst" features of the various ads
4. Have the students select their favorite ads . . . or those that might "win" certain categories, such as most effective, best use of color, most creative, best slogans, most unusual fonts / typefaces, etc.
5. Challenge the students to suggest improvements to one of the "worst" ads, attempting to enhance the communication value of the media
6. If time allows, repeat this process while rating the visual impact of some form of electronic media (like a music video or computer game)

4-5 Cover the process of developing print media

1. Introduce the practice of creating visual media in the publishing and printing sector, such as . . . .
   - Flyers, brochures, etc.

- Posters
- Governmental artifacts such as currency and postage stamps
- Magazine and book cover designs
- Billboards and other large displays
- Other

2. Review the design (problem solving) model found in the class textbook, which will include these types of procedures
   - Audience assessment
   - Brainstorming
   - Ideation
   - Development of thumbnail images, "roughs", etc.
   - Developments of comprehensive layouts
   - Preparing camera-ready copy
   - Color separation (as necessary)
   - Other
3. Have the students design a piece of print media, perhaps using one or more of these themes . . . . .
   - Mini-brochure on how to use a computer software that is available in the communication classroom or laboratory
   - Brochure of cell phone etiquette
   - Promotional flyer for the T.E. program
   - Poster about the use of fonts / typestyles in print media
4. Provide time for the students to develop their media
5. Have each student explain their completed media to others in the class
   Note: The completed work may be used during Unit #5,when each of the students will need a project to print or publish during the lesson on graphic reproduction techniques

6-10 Introduce storyboarding as applied to multimedia (motion pictures, animation, television commercials, etc.)

1. Outline how storyboards are used in modern media
2. Review the “information” found on standard storyboard forms
   - Pictorial sketches for planning individual scenes
   - Voice (oral) elements such off screen narration
   - Audio or visual special effects
   - Musical accompaniment
   - Other
3. Split the class into small groups and have the teams design a commercial for a selected product or event
   Note: You may wish to have (a) each group develop a commercial for a different theme so a variety of formats might be reviewed, or (b) have each group focus on the same theme then compare the wide variety of concepts that are used when promoting the same basic message

Day Instructional Outline (Lessons / Activities / Notes)

4. Provide sufficient time for the teams to following the design process for this assignment
   Note: Both English and Social Studies instructors might be helpful as the students are developing their storyboards
5. Schedule a show-and-tell period so that the teams can describe their completed storyboards
   Note: Perhaps ask the class to vote for their favorite design, again stressing the importance of consumer feedback in the subjective world of media design

11-13 Review the formal means used to critique commercial media

1. Collect samples of media ratings for the proceeding weeks or months (such as Nielson ratings for the previous week, or the top rated movie releases for the past few weeks)
2. Explain how research firms collect data from consumers, viewers, listeners, etc., using published lists and information in the class textbook
3. Review the opinions of the class . . . . . how do their views match up with official ratings for the following:
   - Most watched TV programs for the previous week
   - Favorite movies in the past month
   - Number 1 rated sports broadcast from the previous weekend
   - Most listened to radio station in the local market
   - Favorite DJ or radio personality during the morning drive time period
   - Other
4. Use commercial rating media or websites to further explore this topic
5. Have the students create a 1-page survey instrument to measure the opinions of their peers concerning local media and / or programming
6. Duplicate these survey forms so that they are ready to be distributed by the students the following day

14 During the regular class have the students survey a large percentage of students in the school (perhaps in a study hall or during a lunch period) to collect data on local media

1. Ask others to complete the questionnaires
2. Provide time to tabulate the results of the surveys
3. Prepare charts, graphs, or PPT slides of the accumulated data
   Note: A math teacher might be consulted to determine the best means of displaying the data in an efficient manner, or to draw conclusions from the derived values
4. Determine some way to communicate the results of this activity in the school or local media . . . . perhaps through a community newsletter or via the morning announcements over the PA system (as students all over the

Day Instructional Outline (Lessons / Activities / Notes)

school may be interested in the popularity of various stations or media, and something that might generated interest in the T.E. program)

15 Conclude the unit by evaluating the student's work

1. Collect all developed materials for grading (print media, storyboard forms, survey instruments, etc.)
2. Develop and give a quiz or test over content covered during both Unit #1 and #2 of the course

Evaluation

Students may be evaluated on these actions and related criteria . . . .

- ✔ Participation in classroom and laboratory activities
- ✔ Completion of brochures or flyers, storyboard forms, handouts
- ✔ Following a prescribed design / problem solving process
- ✔ Communication value of developed media
- ✔ Oral presentation over plans, media, etc.
- ✔ Scores on teacher-created tests and quizzes

Unit 3 / 15 Days

Visual (Imaging) Systems

Photographs have been used to capture moments in history for over a century. Matthew Brady, a noted photographer of Civil War events, was among the first to record historical events through photographs. Later, color slides, filmstrips, and motion picture film became popular ways of preserving visual images. Medical specialists use X-rays and scanning equipment to peer into the human body. Today most chemical-based media have given way to digital formats.

Taking pictures, such as family or vacation photographs is much different from the commercial applications associated with visual media. They really are two entirely different activities. The first tries to capture a moment in history for later reference, usually on a spontaneous and random basis. Photographic communication involves preparing images to promote a product or idea, to convey information, or to develop attitudes. Photo journalism, commercial photography, medical imaging firms, and other business ventures all rely on visual technologies.

This unit will introduce students to the fundamental principles of visual (imaging) systems and allow them to use photographic equipment and materials to produce various messages. It will help students to plan a visual message, expose and develop images, edit various images, and produce and display prints.

The primary decision (for the instructor) before starting the unit involves whether to focus on chemical-based film or digital equipment throughout the lesson. Since some schools still have darkrooms available (for photo-processing and pre-production tasks related to lithographic printing), that equipment might be used during Unit #3. Others will probably use digital cameras, photo-editing software, and modern scanners to complete the activities outlined in this unit. Ideally, students might benefit from studying a combination of these mediums.

Objectives

Upon completing this unit each student will be able to:

- ✔ Describe the difference between recreational photography and modern photographic communication
- ✔ List and explain the major steps in producing a visual message
- ✔ Plan a photographic communication message
- ✔ Edit an image using modern software
- ✔ Describe the essential parts and operation of modern cameras and scanners
- ✔ Print and display visual media

Proposed Schedule For The Unit

Day	Content / Activities
1	Introduce the commercial applications of modern imaging techniques
2-3	Review the procedures associated with the available equipment
4-7	Plan, set-up, and capture images to complete a visual story
8-10	Review photo editing software or systems
11-12	Print-out visual media
13-15	Complete a visual display of recorded images

Outline For Unit #3

Day — Instructional Outline (Lessons / Activities / Notes)

1 Define visual media . . . . which is technical communication based on products or media that can be seen but not heard, felt, etc.

1. Common formats or applications . . .
   - Recreational photography
   - Commercial portrait (photographic) businesses
   - Pre-production work in the printing industry
   - Medical imaging procedures
2. Describe the variety of equipment used for modern photographic work
   - Process cameras
   - One time use, point-and-shoot cameras
   - Single lens reflex (SLR) camera
   - Digital cameras
   - Magnetic resonance imaging equipment
3. Identify how images are captured on chemical-based film or by digital means (i.e., review basic camera operations)
4. Use sample scans, color photographs, X-rays, etc. as samples of photographic technologies in modern life
   Note: Many scientific concepts can be covered here, whether related to chemical-based film or the assembly of electronic imagery via charge-coupled devices
5. Identify area business ventures that are related to this field of communication technology
   Note: Obviously, this should help establish a link between modern technology and local economic ventures

Day	Instructional Outline (Lessons / Activities / Notes)

2-3 Cover the appropriate procedures for the technologies that will be used during the lesson

1. Review relevant equipment
   - Camera parts
   - Camera features and accessories
   - Flash attachments and / or lighting kits
   - Care
2. Provide time for the students to experiment with the cameras and related equipment
3. Use a simple in-class assignment to help reinforce the appropriate procedures for the students

4-7 Plan and capture a set of images that "tell" a story

1. Identify how photographic technologies are used to communicate feelings, emotions, and information solely with pictures
2. Provide an overview of industrial communication, such as how pictures are used in brochures or school textbooks to compliment the text
3. Divide the class into small teams and challenge each group to develop a photographic display about "how to do something" . . . . such as how to develop a screen printing master or how to prepare colorful graphics for a new consumer package
   Note: It is recommended that each group focus on a different theme
4. Review the student's ideas and approve all project suggestions
5. Distribute the available equipment and initiate the work
   Note: It's often a good idea to specify that each "story" must be 8-14 scenes in length, and to start by having the students storyboarding the main images they will need to capture with their cameras
6. Monitor the progress of the work, assisting the teams as required

8-10 Review photo development and / or imaging software

1. Identify how to use darkroom equipment, photo imaging software, etc. as appropriate to the activity
   - Imaging software
     - ✔ Computer systems
     - ✔ Cables or transfer disks
     - ✔ Features
     - ✔ Input, processing, and output steps
   - Darkroom facilities
     - ✔ Procedures
     - ✔ Safety guidelines
     - ✔ Clean-up
   - Other

Day Instructional Outline (Lessons / Activities / Notes)

2. Supervise the developing process for the imagery, whether using digital means or chemical-based film
   Note: This process may include the "cropping" of images, a common practice in modern communication
3. Highlight any interdisciplinary linkages, such as chemistry and darkroom procedures, or the physical characteristics of color and light in the captured images

11-12 Print the visual images

1. Identify how the students will be displaying their images, such as mounting prints on a posterboard or by placing the images in a PowerPoint presentation file for showing on a large screen
2. Have the students produce the imagery on print paper, film, standard paper or cardstock, etc. so that they may organize their "story"

13-15 Complete a visual display of the student's images

1. Schedule a show-and-tell period for the teams to describe their completed work
2. Supervise the organization of the completed scenes, which might involve the mounting of cropped pictures on a display board
3. Conduct the students presentations, reminding each team that the pictures should "speak for themselves"!
4. Collect the completed work for evaluation
5. If time is available, perhaps describe the work on famous photographers throughout history (Brady, Adams, etc.)

Evaluation

Students may be evaluated on these actions and related criteria . . . .

- ✔ Attendance and participation in class activities
- ✔ Completion of planning worksheets, forms, etc.
- ✔ Ability to follow the appropriate procedures
- ✔ Efforts in capturing, developing, and displaying the imagery
- ✔ Formal presentation over the approved theme

Unit 4 / 10 Days

Audio Communication Systems

This unit will introduce students to the fundamental principles of audio technologies and allow them to use equipment and materials to produce audio messages. This type of media involves communication that is heard, and can include both live exchanges and recorded audio. A microphone and loudspeaker system would be an example of devices used during a live event, while digital music files (saved on CDs or a laptop computer) would be an example of a previously recorded media.

Communication via human-detectable sound can be traced back throughout recorded history. Early civilizations used grunts, loud noises, etc. to exchange crude messages. In thick jungles, drums and chants were used to transmit information among villages. Following the discovery of electricity, the telegraph brought us the familiar sounds of short "dots" and longer "dashes" as coded signals were sent along wires. Eventually radio stations began broadcasting music, sports, and talk programming. Today, MP3 players and cell phones are very popular devices.

The telephone, commercial radio, and digital music systems are three dominate forms of media in the modern world. Each helps us hear voices or melodies, either in real-time or recorded for later playback. Students should know how these devices and systems operate, as well as understand the unique design and programming required for audio technologies.

Resources for Unit #4 might be obtained from a number of different programs around the school. Certainly the media center will have a variety of microphones. The music and theater departments often have different types of audio devices as well. Cassette decks and digital media players might also be found in the media center, along with accessories such as cables and stands. Frequency generators and oscilloscopes are typically found in science and technology programs. It is suggested that enough RW-CDs or cassette / digital tapes be purchased so that each student will have their own “recording” to keep at the conclusion of the course.

Objectives

Upon completing this unit each student will be able to:

- ✔ Describe the difference between audio media and other forms of communication technology
- ✔ List and describe examples of audio devices, systems, and technologies
- ✔ Explain how audible messages are converted into signals for transmission of information and data
- ✔ Record, save, and edit audio files
- ✔ Plan and produce a simple radio commercial

Proposed Schedule For The Unit

Day	Content / Activities
1-2	Introduce the unique technologies associated with audio devices and systems
3-5	Design a radio commercial
6-8	Record and edit audio files
9-10	Review examples of audio media

Outline For Unit #4

Day — Instructional Outline (Lessons / Activities / Notes)

1 Initiate the unit by describing examples of audio devices and technologies

1. Identify common types of audio equipment
   - Public address systems (found primarily in large buildings)
   - Home stereo systems
   - MP3 players
   - Bullhorns
   - Car / truck radios
   - Telephone systems
   - Surround sound systems (found in theaters and auditoriums)
   - Associated technologies such as radar and sonar
2. Explain the basic components of audio "systems"
   - Collection devices (microphones, players, etc.)
   - Transmitters
   - Signals (human audible versus non-audible)
   - Receivers
   - Storage devices
3. Review the physical aspects of sound
   - Characteristics of waves
   - Cycles
   - Transmission techniques (in various environments)
   - Obstacles to sound transmission (interference, insulation, etc.)

   Note: Many scientific principles are covered here, so include links to physics when discussing the modern electronics
4. Discuss how mathematics plays an important role in engineered systems, including the formulas for specifying frequencies, wavelengths, etc.
5. Review related topics as time allows . . . . . such as noise reduction technologies (i.e., Dolby technologies), digital AM / FM signals, Internet downloads of music, etc.

Day Instructional Outline (Lessons / Activities / Notes)

2-5 Challenge the students to develop a radio commercial

1. Describe the nature of radio advertising, perhaps by playing samples of familiar jingles or radio "spots"
2. Identify the common aspects of media designers (forms, tools, etc.)
3. Outline key guidelines for the assignment, such as . . . .
   - Length of exactly 30 seconds
   - At least one audio sound effect must be included
   - Theme music is recommended
   - A narrator (announcer) is required for "live" voice work
   - Other
4. Provide class time to plan the commercial
5. Have each team submit their plan on worksheets, notebook paper, etc .
   Instructor's note: Review the proposed concepts carefully for content and format, allowing for cleaver and unique themes yet maintaining the formality required for purchased air-time on a public station

6-8 Record and edit the radio commercial

1. Demonstrate how to record the audio with the available equipment
2. Introduce the use of audio CDs as a means of incorporating SFX and music in the commercials
3. Supervise the teams as they record and manipulate the audio files on tape or diskette
4. Demonstrate how to record the audio with the available equipment
5. Have the teams play their commercials for others in the class
   Note: Perhaps conduct a simple vote to determine the "best" in various categories, such as the funniest commercial, best use of music, most realistic radio advertisement, etc.

9-10 Review additional forms of audio media

1. As time allows, review additional topics related to audio media . . .
   - Voice Systems
     - ✔ Show a movie about the development of the modern telephone
     - ✔ Research emerging technologies like VOIP (Voice over Internet Protocol) on the WWW
     - ✔ Compare different types of microphones (from the media center)
     - ✔ Record your voice using iTunes or similar software, then manipulate the files (creating an echo, rearrange words, etc.)
   - Tours / Guest Speakers
     - ✔ Visit a local radio station or the media center in the school district
     - ✔ Invite a radio announcer from a local station to address the class
     - ✔ Ask a sales representative from an area consumer electronics store to describe high-fidelity stereo equipment

Day Instructional Outline (Lessons / Activities / Notes)

- Related activities
  - ✔ Review new models of cellular telephones (or services)
  - ✔ Review the process of "ripping" audio Cds
  - ✔ Connect a microphone to an oscilloscope so that students can "see" their voice displayed on the screen as they talk
  - ✔ Show a video about radar or sonar technology

2. Develop informative handouts and / or worksheets to help supplement the topics presented during these final days of the unit
3. At the conclusion of the lesson, collect all materials and give a quiz to evaluate what the students learned about the topic(s)

Evaluation

Students may be evaluated on these actions and related criteria . . . .

- ✔ Participation in classroom and laboratory activities
- ✔ Research and design of a radio commercial (forms, worksheets, etc.)
- ✔ Teamwork during the development of the commercial
- ✔ Quality of a final solution (nature of the recording, editing, etc.)
- ✔ Scores on a teacher-created quiz

Unit 5 / 15 Days

Graphic Reproduction Systems

Among the many ways to communicate ideas and information, the printed word remains one of the dominate means in today's Information Age. This type of technology is referred to as printing, copying, graphic arts, or graphic reproduction. Printing involves producing words, line drawings, and pictures on sheets of paper or other surfaces (often referred to the as the "substrate").

Once a graphic (visual) message is conceived by either an individual or by a team of professional designers, there are several tasks that must be completed before the product is in its final form. These are the key steps . . .

- The audience and intended message are clearly defined
- An appropriate method of printing is chosen for the media
- Visual images, text, etc. are generated and assembled
- Images are converted to a suitable format
- Reproduction devices or systems are prepared
- The product is printed (often in mass quantities) to fulfill the needs of the person or venture
- Appropriate finishing operations are used on the product(s)

Naturally, much of this work once involved manual labor. Hundreds of years ago workers "pulled" pieces of type (i.e., individual letters) from California job cases, and hand-set the messages that would be printed on Gutenberg-style presses. Later, darkroom work with large process cameras and trays of chemicals were common in both schools and industries. Today a great deal of the work is completed inside a computer using a process now known as desktop publishing (DTP).

Common output processes used to produce graphic messages include offset lithography, screen process printing, standard photocopying, and ink jet printing. During this unit students will learn the steps that are used to produce various printed graphic messages.

Objectives

Upon completing this unit each student will be able to:

- ✔ Describe the design principles and processes used to generate graphic media
- ✔ Describe the various types of image generation methods used in modern communication
- ✔ Generate and assemble images for various printing processes
- ✔ Prepare an image carrier for a printing project
- ✔ Print a variety of products
- ✔ Use appropriate finishing techniques to complete selected media

Proposed Schedule For The Unit

Day	Content / Activities
1-5	Introduction to desktop publishing Prepare masters, copy, etc.
6-9	Printing and publishing tasks
10	Finishing procedures
11-14	Screen process printing
15	Specialty printing techniques

Outline For Unit #5

Day — Instructional Outline (Lessons / Activities / Notes)

1-5 Introduce the basics of desktop publishing techniques

1. Define technical terms such as graphic design, desktop publishing (DTP), camera ready copy, etc.
2. Demonstrate the layout software that will be available for student use later in the unit
   Note: It will likely take several class periods to review even the basic fundamentals typical of today's DTP programs
3. Use examples of camera-ready masters to illustrate the design and pre-production techniques used in graphic communication
4. Identify various types of visual media that can be developed using standard paper or cardstock in 4-6 class periods, such as . . . . .
   - Greeting cards
   - Stationery
   - Posters
   - Pamphlets
   - Brochures
   - Flyers

   Note: Avoid printing on T-shirts, cardboard, or other mediums as those materials and processes will be reviewed later in this unit
5. Assign the formats and themes to individuals or small teams, and initiate the design process first outlined in Unit #2, using materials started in that earlier unit or use several of these suggestions . . . . .
   - Promotional media
   - School-related items (with a logo or mascot)
   - Description of the T.E. department / program

Day Instructional Outline (Lessons / Activities / Notes)

- Programs for extra-curricular events
- Directory of school clubs / organizations / special groups
- Other

Note: These focused assignments should help the students apply a structured design process while creating a new piece of media, starting with audience assessment and a consideration of technical factors and concluding with a useful item

6. Assist the students as they plan and organize their graphic media with the available computer systems and software
7. Review to determine if all the graphic "masters" have been adequately prepared before moving forward

6-9 Prepare for and print the developed media

1. Demonstrate pre-production techniques required for the equipment that will be used to produce the graphic media
   Note: Hopefully, this involves an offset press, but could involve other means of printing / publishing
2. Assembly the paper (stock) and inks required to print 25-100 copies of each project
   Note: If enough resources are available, it is nice to print at least one copy (of each project) for every member of the class in additional to any copies that will be distributed / posted / used
3. Highlight the safety guidelines appropriate for the machinery, equipment, or tools that will be used by the students
4. Schedule the sequence of printing work
5. Print / publish the projects, with the students doing as much of the work (and clean-up) as practical

10 Review finishing procedures for graphic media

1. Use examples of familiar products to illustrate important graphic production steps such as . . . .
   - Trimming
   - Collating
   - Folding
   - Stapling
   - Binding
   - Drilling
   - Stapling
   - Perforating
   - Gluing
   - Other
2. Have the students complete their media

Day Instructional Outline (Lessons / Activities / Notes)

3. Be sure the students clean-up their areas and return all resources to the appropriate places

11-14 Cover the familiar technique of screen process printing

1. Introduce the applications of screen process printing with various examples (T-shirts, posters, etc.)
2. Describe the equipment and supplies require to print on various materials using this common technique
3. Demonstrate how to . . . .
   - Prepare camera-ready clipart
   - Use a plate burner to expose light-sensitive polyblue film (or how to hand-cut the film)
   - Install the screen material in a frame
   - Adhere the film to the screen
   - Mask off the image area
   - Use a squeegee to force ink through the image area
   - Clean up the screen, frame, and work area
4. In small teams, have the students design a single color image / graphic that can be easily printed (preparing the artwork and then the screens themselves)
5. Have each group print a number of copies of their design using screen process equipment

15 Focus on specialty printing techniques

1. Select a video or CD-ROM that covers a unique type of graphic reproduction and use the media to cover another process

   OR

   Use the final day of the unit to conclude laboratory work not yet completed
2. Give a short quiz to evaluate what students have learned during the unit on graphic communication technologies

Evaluation

Students may be evaluated on these actions and related criteria . . . .

- ✔ Participation during class and laboratory lessons
- ✔ Knowledge of definitions, procedures, and equipment
- ✔ Completion of worksheets or forms
- ✔ Ability to use graphic machinery and supplies in an appropriate manner
- ✔ Quality of the developed media
- ✔ Participation in small group activities
- ✔ Scores on a teacher-created quiz

Unit 6 / 15 Days

Telecommunication Systems

Perhaps the most significant advancements in the past century has been in electronics and information technology (or IT). Common devices and systems surround us: cellular telephones, electronic commerce, personal digital assistants (PDAs), satellite and cable television, and the Internet. These digital marvels were not a part of our grandparents' generation, but certainly dominate our daily lives.

Electronic communication technology includes all those technical systems that use electromagnetic energy to exchange messages with others. Electric current can easily be altered to create different kinds of signals, beams of visible light, or pulses of electrical current. Technological devices then amplify, code and decode, transmit these signals over varying distances. We refer to the exchange of messages between remote locations as telecommunications. Household devices (TVs, radios, etc.) are often referred to simply as "consumer electronics".

In this country, the mass media is a familiar type of electronic communication system. Electronic media have both a video (visual) and audio component. Popular television and radio broadcasts are sent to our homes as electronic signals for our enjoyment. News and educational programming keep us constantly updated concerning important local and global events. Communication devices and systems connect us with nearly every spot on the face of the earth.

This unit will focus on communication and information technologies that transmit messages over great distances. Thus the term telecommunication is used, as "tele-" is the Greek term for "far". Broadcasting is one of the major topics found in Unit #6.

An understanding of electronic communication systems is essential to preparing the citizen of tomorrow. So much of their daily lives will be influenced by this technology; it will alter how they work and play. Therefore, this course is important in preparing students for life in the electronics age.

Objectives

Upon completing this unit each student will be able to:

- ✔ Describe the application of electronics in modern communication systems
- ✔ Explain familiar electronic communication devices or networks using a systems model
- ✔ Describe various classifications of electronic media
- ✔ Identify how electronic media is regulated at the local, federal, and international levels
- ✔ Design and produce a videotaped message

Proposed Schedule For The Unit

Day	Content / Activities
1-2	Introduce the basics of electronics in modern information technology Review how communication systems are regulated
3-5	Explore how electronic devices generate, transmit, and receive signals
6-7	Design and build various electronic circuits
8-15	Design and develop broadcast media

Outline For Unit #6

Day — Instructional Outline (Lessons / Activities / Notes)

1-2 Introduce the unit by covering the nature of electronics in modern telecommunication systems

1. Examples of systems
   - Microwave networks
   - Commercial broadcasting (TV and radio)
   - Satellite systems
   - Wi-Fi “hot spots” (i.e., wireless Internet zones)
   - Cable entertainment networks
   - Security (monitoring) systems
2. Explain how a device is different from a system; it’s just how each item is labeled or identified
   Note: It is often difficult to distinguish between a device (such as a cell phone) that is actually made up of smaller sub-systems, versus a communication satellite which is a complex device that functions within a much larger telecommunication network
3. Cover how to apply a standard model to describe technical devices or entire systems
   - Sender
   - Encoding messages / signals
   - Transmission channel / mediums
   - Decoding messages / signals
   - Receiver
   - Influence of interference
4. Describe the role of numerous government agencies in regulating modern communication, such as . . . . .
   - Federal Communication Commission (FCC)
   - Federal Aviation Administration (FAA)

Day Instructional Outline (Lessons / Activities / Notes)

- Underwriters Laboratories (UL)
- Motion Picture Association of America (MPAA)
- Others

5 Describe the classifications of frequencies as established by the FCC
Note: Each electronic device must operate within a separate range of frequencies, so the electromagnetic spectrum is divided into areas such as Very High Frequencies (or VHF, common of TV broadcasts), Super High Frequencies (commonly know as microwaves), UHF, etc.

6. Use a video to highlight telecommunication systems in modern business or industry

3-5 Explore how electronic devices generate, transmit, and receive signals

1. Obtain small electronic (i.e., 60-in-1) devices or commercially available kits that can be assembled easily to demonstrate basic electrical and electronic concepts, including . . . .
   - Power supplies (both AC and DC units)
   - Transistors, resisters, capacitors, and similar “building blocks”
   - Switches, buttons, sensors, etc.
   - Connecting wires
   - Antennas
   - Other

   Note: Be sure to cover the appropriate safety guidelines when working with these resources
2. Connect (i.e., assemble or build) several basic devices, such as a manually-activated burglar alarm or an AM radio transmitter
3. Have the students identify the major components of each device and explain how it operates
   Note: Many scientific and mathematical concepts may be integrated how, as waves and signals are generated and transmitted
4. Challenge the students to design and build increasingly more complex devices, such as light-activated detection circuit that turns on or off a light (or a similar complicated device)

6-7 Design and build various electronic circuits

1. Obtain parts from a local electronics store or a T.E. supplier so that students can assemble a simple electronic device (versus simply connecting wires on a bread-board kit)
2. Demonstrate the care and safe use of electronic components, equipment (soldering irons, drills, power suopplies, etc.), and instruments (VOMs, etc.)
3. Have the students assemble an electronic device that reflects the circuitry common in modern communication devices or systems

Day Instructional Outline (Lessons / Activities / Notes)

8-15 Develop broadcast media

1. Organize a videotaping activity that can simulate the work of broadcasters, camera crews, studio technicians, etc. such as . . . .
   - Produce a 10-30 minute news, weather, and sports segment
   - Videotape a Public Service Announcement (PSA) related to a local agency or program
   - Create a short videotaped feature that could be played during the school's morning or afternoon announcements
   - Other

   Note: Depending upon class size and available equipment, this might be an all-class effort or you might have 2-3 larger groups all work on a different project (at the same time)
2. Assemble the resources required for the activity including camera equipment, monitors, lights, tripods, etc.
3. Help the students in identifying the type of assignment (challenge) that they will work on over this 8-day activity
4. Require that a script and storyboard forms be completed by each team prior to the start of video production work
   Note: Language arts and public speaking skills are important for broadcasters, narrators, and others in the public eye
5. Have each group develop a schedule and formal list of assignments as part of the planning phase
6. Demonstrate the appropriate use of all equipment that will be required during the activity
7. Supervise the video work, editing, acting, etc. throughout the activity
8. Have the teams complete a post-production work to insure that their video is in a suitable format for use (and evaluation)
9. Show (or distribute) the media
10. Collect all planning paperwork, laboratory worksheets, forms, and videotapes for evaluation

Evaluation

Students may be evaluated on these actions and related criteria . . . .

- ✔ Involvement during class and laboratory activities
- ✔ Participation in small group activities
- ✔ Efforts on worksheets or forms
- ✔ Development of electronic devices and apparatus
- ✔ Ability to use instruments and tools appropriately
- ✔ Efforts during the video (broadcasting) production activity

Unit 7 / 10 Days

Internet-based Communication

The world changed dramatically in August 1995 with the introduction of Netscape (the firm that released the popular software for "surfing" the World Wide Web). While global information networks had existed for decades, Netscape provided a new type of "browser" software which allowed individuals to more easily access the Internet. Based on this new program, people and organizations began to see the Internet for as important tool for communication. In just over a decade over 6 billion pages of information have been posted on the World Wide Web, and seemingly the entire planet has become hyper-linked.

The Internet is a true wonder of the modern world. It is useful for numerous tasks, from e-mail and academic research to gaming and electronic commerce. Establishing a presence on the WWW (i.e., a website) is critical to recognition and communication. For example, your school probably has a website that contains important information that is needed by students, teachers, parents, and members of the community. Almost any topic, from entertainment news to driving directions, can be researched on the WWW.

During this unit, teams of students will be given a topic or theme, and challenged to create an informative series of Internet pages. If approved, you might wish to post the pages on your school's site. It's fun for students to see that the media they have created during routine class activities is useful for enhancing communication.

Also, students will be able to evaluate electronic systems and media via the Internet. This is the final unit in the Communication Systems course, so it is an ideal time to conclude the class with an analysis of "how far we've come" in preparation for addressing the more important question of "where are we headed?". This type of knowledge will help the students prepare for their lives in an ever-shrinking world.

Objectives

Upon completing this unit each student will be able to:

- ✔ Define basic Internet terms such as the browser, bandwidth, hyper-link, URL, Internet Service Provider (ISP), World Wide Web (WWW), etc.
- ✔ Explain the advantages and disadvantages of global information networks
- ✔ Use the Internet to research various topics and / or gather information
- ✔ Identify the steps in establishing a website on the WWW
- ✔ Post various pages of information on an Internet site
- ✔ Explain how to assess (evaluate) communications devices and systems
- ✔ Learn how to better live, work, and play in an interconnected world

Proposed Schedule For The Unit

Day	Content / Activities
1	Describe how information networks are organized and maintained
2-7	Challenge the students to design various WWW pages / screens
8-9	Evaluate the nature of global networks, today and into the future
10	Complete a final exam (test) for the course

Outline For Unit #7

Day	Instructional Outline (Lessons / Activities / Notes)

1 Introduce the basic concepts of global networks

1. Review definitions related to network technologies . . . . bandwidth, server, browser, uniform resource locator, hyper-link, etc.
2. Cover the usefulness of the World Wide Web (WWW)
   - Education
   - Basic information
   - Entertainment / recreation
   - Research
   - Routine communication
   - Electronic commerce
   - Travel planning
   - Other
3. Explain how global networks are developed, operate, and are maintained
4. Describe how to use the Internet and WWW in a constructive, informative manner . . . . .
   - Etiquette
   - Appropriateness
   - Authentication of information
   - Spamming and other practices

   Note: Inform students that these “public” networks have few guidelines, and can link them to both desirable and un-desirable sites and people

2-7 Design WWW sites / pages

1. Determine the best way to prepare and publish WWW pages (select a special program or use the Internet features in Netscape Composer or Microsoft Word to create HTML documents

   Note: Some programs allow you to develop and review the pages without actually posting the information to the Internet (should that be desirable)

Day Instructional Outline (Lessons / Activities / Notes)

2. Cover how "pages" for information are posted to Internet servers (for access by anyone who enters in the appropriate URL), either on your school system or to an outside ISP
3. Demonstrate how to compose, edit, and post WWW pages
4. Challenge the students, individually or in small teams, to create a WWW site for a specific "client" . . . .
   - An academic department in the school
   - A school team
   - Pages for student organization or clubs
   - Sites for each of the classes offered in the T.E. program
   - A page outlining a special event / program

   Instructor's Note: Again, these sites can be developed and not actually posted on the World Wide Web (i.e., a public site) where they would be seen by others outside the class
5. Identify which students will be responsible for the development of the sites, and have them work with representatives from beyond the T.E. program when planning and creating the pages
   - Highways, rail lines, pipelines, race tracks, etc. on land
   - Canals, rivers and lock systems, ocean lanes, etc. on water:
   - Air traffic control route through the earth's atmosphere
   - Tracking systems, launch systems, etc. related to space travel
6. Demonstrate how to manipulate text and graphics for the sites
7. As the sites are completed, have each student or team describe their web graphics to others in the class during a show-and-tell period

8-9 Evaluate the nature of global networks, today and into the future

1. Using search engines on the Internet, have the students explore these types of topics . . .
   - How long has the Internet existed?
   - Name some of the individuals and organizations created with starting the Internet
   - What new Internet-ready devices are on the market?
   - How many people use the World Wide Web today? Which country has the most users?
   - How many pages are found in the WWW today?
   - What types of information can be found on the school district's formal website?
   - Where might a person go to college to become a website developer? What degree would it involve? How much does a website developer make per site or year?
   - How do experts think the Internet will be different in the future?
   - Other

Day Instructional Outline (Lessons / Activities / Notes)

10 Conclude the class with a test
1. Evaluate the level of knowledge and understanding by developing and giving a test to assessment student learning
2. Grade and return all course materials

Evaluation

Students may be evaluated on these actions and related criteria . . . .

- ✔ Participation during classroom and laboratory activities
- ✔ Knowledge of Internet terms and networking concepts
- ✔ Completion of design paperwork
- ✔ Production of a creative, informative website
- ✔ Efforts and information from the Internet research activity
- ✔ Scores on teacher-created test at the conclusion of the course

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